CLAIMS

1. A method of arranging image data representing a motion picture sequence (I0, B1 etc) within a memory sub-system (150, 210,220) in an image data processing system (200-220), the method comprising dynamically selecting (190) the arrangement of image data for successive pictures (I0, B1 etc) of said sequence in said memory according to at least one of: measured characteristics of said image data, measured characteristics of the performance of said processing system, and known characteristics of subsequent processing of said image data within said image processing system.

2. A method as claimed in claim 1, wherein said memory sub-system (150) includes an image data storage memory (220) constructed from paged memory.

3. A method as claimed in claim 1 or 2, wherein said memory sub-system (150) includes a processor cache memory (210) in addition to a main image data storage memory (220).

4. A method as claimed in any preceding claim, wherein the step of selecting the arrangement of image data in storage memory (220) comprises selecting between a linear format (Fig.4), whereby image data is stored in memory on a line-by-line basis, and at least one kind of tiled format (Fig.7, Fig.9), whereby two-dimensional groups of pixels are grouped in memory (210, 220).

5. A method as claimed in claim 3 or 4, wherein where the memory sub-system (150) includes cache memory (210), said tiled format (Fig.7, Fig.9) is defined such that data for one tile corresponds to a whole number of cache blocks (CBn).

6. A method as claimed in any preceding claim, wherein the method comprises measuring one or more of the following as characteristics of the image data to influence the selection of the arrangement of data in memory (210, 220):-

A. variability of motion vectors encoded within the received data;

B. picture type (I, B, P);

C. encoded data size per picture of the sequence;

D. structure of a picture from which the image data is derived;

E. structure employed for storing an image in image memory;

F. constant characteristics of the stream obtained by decoding the sequence header of the image stream.

7. A method as claimed in claim 6, wherein the method looks ahead in the motion picture sequence so as to measure said characteristics of the image data for a given portion of the sequence and select the memory arrangement prior to processing that portion. .

8. A method as claimed in claim 6 or 7, wherein measured characteristics of the image data at one part of the sequence are used effectively to predict characteristics of a subsequent portion of the sequence, and the memory arrangement controlled according to measured characteristics of recently processed portions of the sequence.

9. A method as claimed in claim 6, 7 pr 8, wherein the measurement of image data characteristics is averaged over a period of time.

10. A method as claimed in any of claims 6 to 9, wherein where the variability of motion vectors is measured separately between vertical and horizontal planes, each having a different effect in the selection of the storage arrangement.

11. A method as claimed in any preceding claim, wherein said method comprises measuring one or more of the following as characteristics of system performance to influence the selection of the arrangement of data in memory (210, 220):-

G. data cache stall rates in the memory sub-system;

H. processor utilisation;

I. quality of service, or other such qualitative measurements that are perceptible to the end user of the content being processed;

J. bandwidth of a link feeding data into or out of said image processor.

12. A method as claimed in claim 11, wherein where said memory sub-system (150) includes cache memory (220), measurement of system performance includes measurement of data cache stall rates during image reconstruction.

13. A method as claimed in claim or 12, wherein system performance is measured on a test basis using a sample of data, prior to processing the data.

14. A method as claimed claim 11, 12 or 13, wherein system performance measured while processing a first part of the sequence is used in selecting the arrangement of memory for a subsequent part of the sequence.

15. A method as claimed in any preceding claim, wherein the method comprises using knowledge of subsequent processing steps to influence the selection of the arrangement of data in memory (210, 220).

16. A method as claimed in any preceding claim, wherein the selection of memory arrangement is implemented at least partly by changing parameters used by memory-accessing program code.

17. A method as claimed in any preceding claim, wherein the selection of memory arrangement is implemented at least partly by selecting different versions of code to be executed.

18. A method of processing image data representing a motion picture sequence (Fig.4) within a memory sub-system (150) in an image data processing system, the memory sub-system (150) including processor cache memory (210) in addition to main image data storage memory (220), the method comprising selectively using cache-handling functions under program control (200), according to at least one of: measured characteristics of said image data and measured characteristics of the performance of said processing system, among those listed in any of claims 2 to 17.

19. A method as claimed in claim 18, wherein a block allocation function, whereby a new cache-block is allocated and overwritten without pre-loading it from the main memory (220), is used selectively according to said measured characteristics.

20. A method as claimed in claims 18 or 19, wherein, in addition, cache pre-fetching is activated selectively in accordance with the measured characteristics.

21. A method as claimed in any of claims 1 to 17, combined with the method as claimed in any of claims 18 to 20.

22. An image data processing system, the processing system including a memory sub-system (150, 210, 220) and means (190, 200) for dynamically selecting the arrangement of image data for successive frames of a motion picture sequence (I0, B1 etc) within said memory sub-system (150) according to at least one of: measured characteristics of said image data, measured characteristics of the performance of said processing system, and

known characteristics of subsequent processing of said image data within said image processing system.

23. A system as claimed in claim 22, wherein the memory sub-system (150) includes an image data storage memory (220) constructed from paged memory.

24. A system as claimed in claim 23, wherein said memory sub-system (150) includes a processor cache memory (210) in addition to a main image data storage memory (220).

25. A system as claimed in any of claims 22 to 24, wherein the means (90, 160, 170, 192, 196, 194) for selecting the arrangement of image data in memory (220) is arranged for selecting between a linear format (Fig.4), whereby image data is stored in memory (220) on a line-by-line basis, and at least one kind of tiled format (Fig.7, Fig.9), whereby two-dimensional groups of pixels are grouped in memory.

26. A system as claimed in claim 24 or 25, wherein where the memory sub-system (150) includes cache memory (210), said tiled format is defined such that data for one tile corresponds to a whole number of cache blocks (CBn).

27. A system as claimed in any of claims 22 to 26, wherein the selecting means (190) includes means (190) for measuring one or more of the following as characteristics of the image data to influence the selection of the arrangement of data in memory:-

A. variability of motion vectors encoded within the received data;

B. picture type (I, B, P);

C. encoded data size per picture of the sequence;

D. structure of a picture from which the image data is derived;

E. structure employed for storing an image in image memory;

F. constant characteristics of the stream obtained by decoding the sequence header of the image stream.

28. A system as claimed in claim 27, wherein the selecting means (190) is arranged to look ahead in the motion picture sequence (Fig.3) so as to measure said characteristics of the image data for a given portion of the sequence and select the memory arrangement prior to processing that portion.

29. A system as claimed in claim 27 or 28, wherein the selecting means (190) is arranged such that measured characteristics of the image data at one part of the sequence are used effectively to predict characteristics of a subsequent portion of the sequence, and the memory arrangement controlled according to measured characteristics of recently processed portions of the sequence.

30. A system as claimed in claim 27, 28 or 29, wherein the measuring means (190) includes means for averaging measured image data characteristics over period of time.

31. A system as claimed in any of claims 27 to 30, wherein where the measuring means (190) is arranged to measure variability of motion vectors, it is arranged to do so separately between vertical and horizontal planes, each having a different effect in the selection of the storage arrangement.

32. A system as claimed in of claims 22 to 31, wherein the selecting means (190) alternatively or in addition comprises means (190) for measuring one or more of the following as characteristics of system performance to influence the selection of the arrangement of data in memory:-

G. data cache stall rates in the memory sub-system;

H. processor utilisation;

I. quality of service, or other such qualitative measurements that are perceptible to the end user of the content being processed;

J. bandwidth of a link feeding data into or out of said image processor;

33. A system as claimed in 32, wherein where the memory sub-system (150) includes cache memory (220), the means for measuring system performance is arranged to measure data cache stall rates during image reconstruction.

34. A system as claimed in claim 32 or 33, wherein the means for measuring system performance is arranged to do so at least partly on a test basis using a sample of data, prior to processing the data.

35. A system as claimed in claim 32, 33 or 34, wherein the selecting means and means for measuring system performance are arranged such that system performance measured while processing a first part of the sequence is used to influence the arrangement of memory for a subsequent part of the sequence.

36. A system as claimed in any of claims 22 to 35, wherein the selecting means is arranged to use knowledge of subsequent processing steps to influence the selection of the arrangement of data in memory.

37. A system as claimed in any of claims 22 to 36, wherein the image processing system is implemented at least in part by program code and a programmable processing unit (200).

38. A system as claimed in any of claims 22 to 37, wherein the selecting means is implemented at least partly by means for changing parameters used by said program code in accessing said memory sub-system (150).

39. A system as claimed in any of claims 22 to 37, wherein the selecting means is implemented at least partly by selecting different versions of code to be executed.

40. An image data processing system including a memory sub-system (150) for storing image data representing a motion picture sequence (Fig.3) being processed, the memory sub-system (150) including processor cache memory (210) in addition to main image data storage memory (220), the system being arranged for using cache-handling functions selectively under program control (200), according to at least one of: measured characteristics of said image data and measured characteristics of the performance of said processing system, among those listed in any of claims 23 to 39.

41. A system as claimed in claim 40, wherein the system is arranged such that a block allocation function, whereby a new cache-block is allocated and overwritten without pre-loading it from the main memory (220), is selectively used according to said measured characteristics.

42. A system as claimed in claims 40 or 41, wherein the system is arranged such that cache pre-fetching is activated selectively in accordance with the measured characteristics.

43. A system as claimed in any of claims 22 to 39, combined with the system as claimed in any of claims 40 to 42.

44. A computer program product, whether on a physical storage device or delivered through some other channel, comprising instructions for causing a data processing system (200) to implement the steps of a method or the features of an apparatus embodying the invention as claimed in any preceding claim.